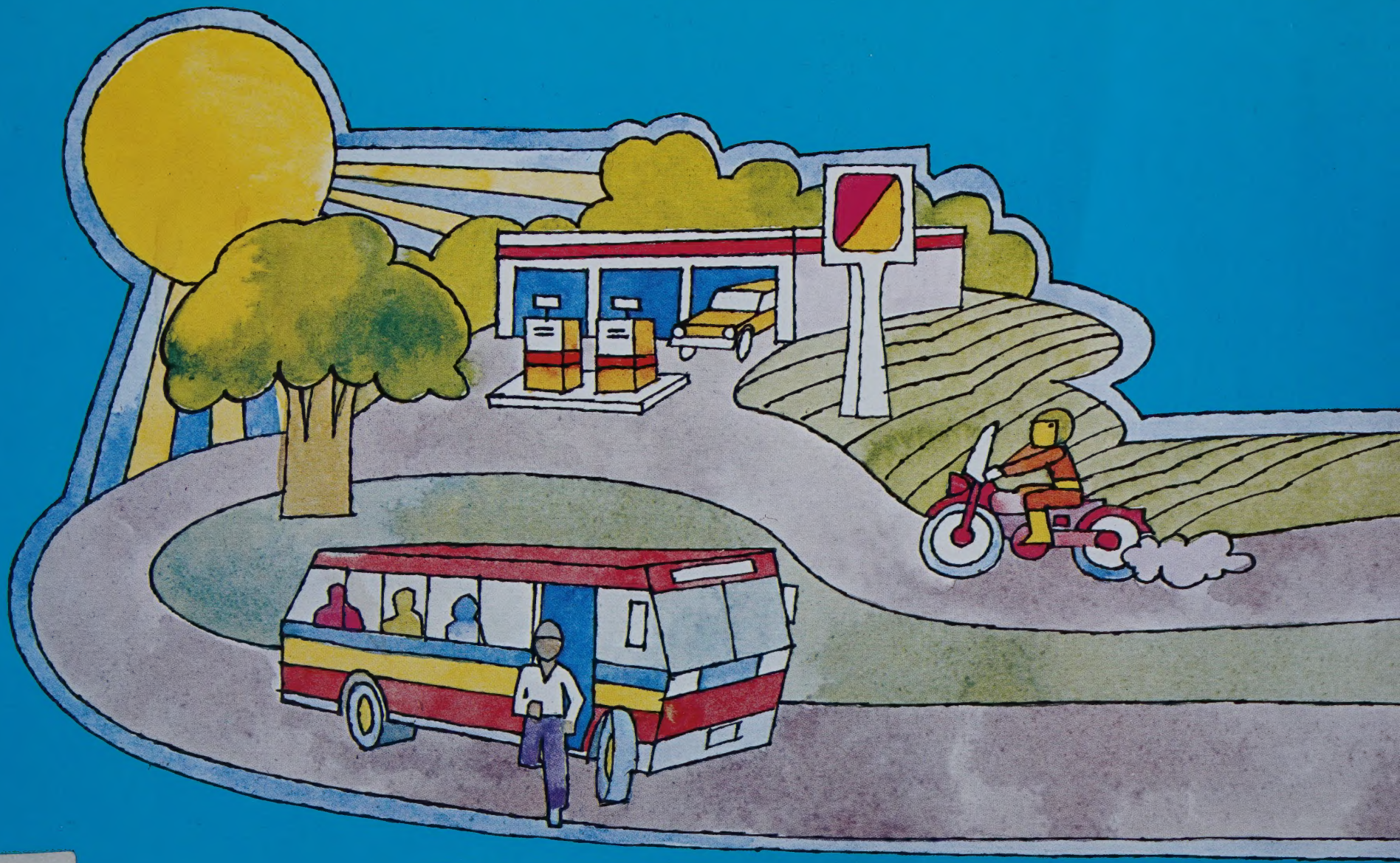

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Energy Everywhere

Answer these questions.

1. How is energy being used in this picture?
2. What sources of energy do you see in the picture?
3. Which of these sources of energy are being used the most by the people in the picture?

2

What are Fossils?
What are Fossil Fuels?

Can you see the prints of leaves in rocks? Can you see the print of a shell?

Prints such as these are fossils. Fossils tell us a lot about animals and plants of long, long ago.

The leaf prints came from plants that lived long, long ago.

The shell print came from a shellfish that lived long, long ago. When the shellfish died, it sank into soft mud. It left the print of its shell in the mud.

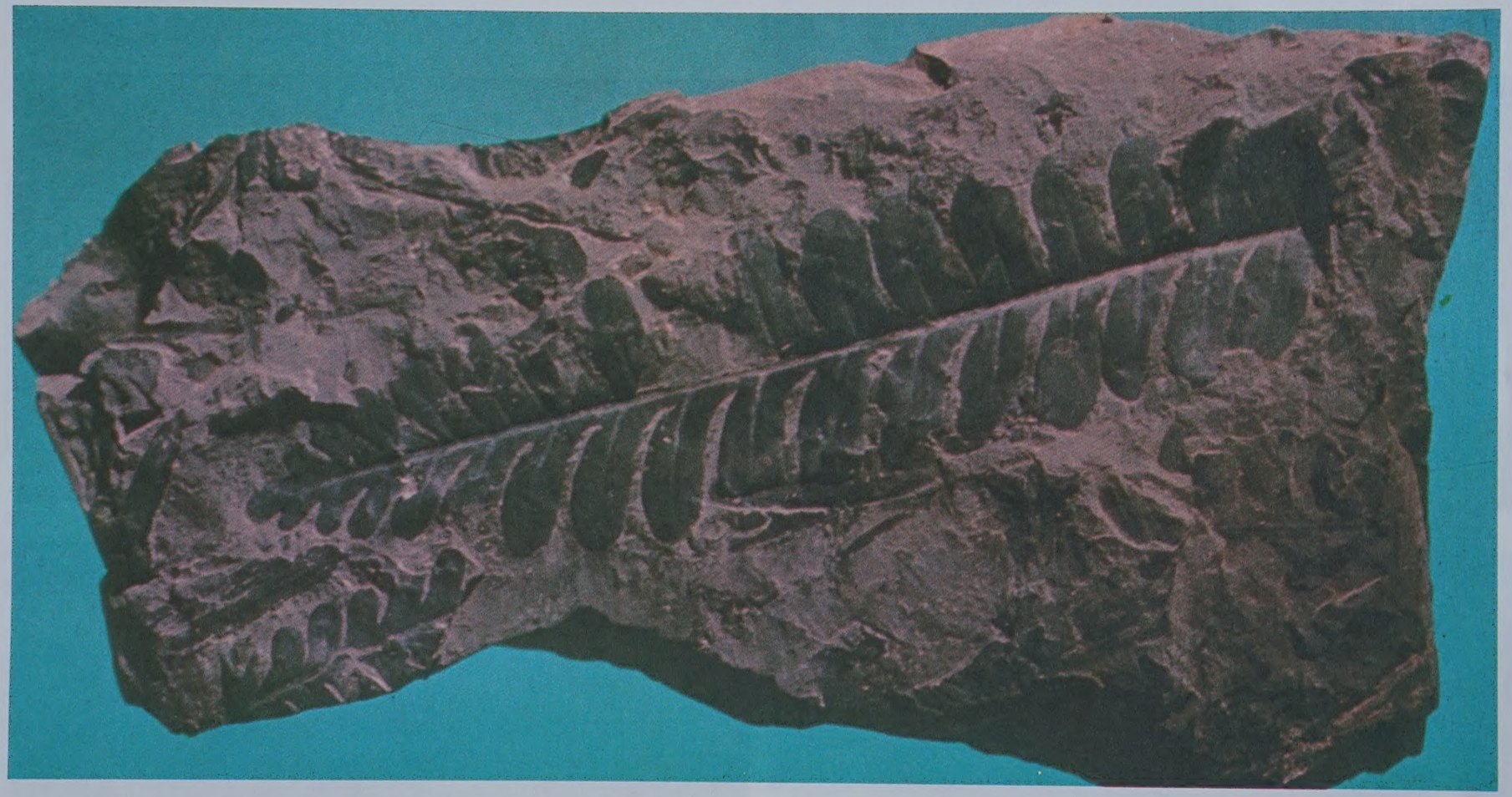
The mud got hard. At last it turned into rock. Bit by bit, the shellfish itself was washed away. But the print of its shell was still left in the rock.

A long, long time passed. Then a fossil hunter spotted the shellfish fossil, and picked up the rock.

Not all fossils are just prints of living things. Sometimes a fossil is the animal or plant itself, or part of it.

Insects of long ago sometimes got stuck in sap that was running from a tree. The insects died. In time, the sap got hard, with the insects still in it. Fossil hunters have spotted lots of insects, such as ants, trapped in hardened sap.

Animals of long ago sometimes got trapped in ice. Mammoths were big animals much like elephants. Mammoths had tusks and trunks. Sometimes a mammoth fell into a big crack in the ice.



Then the animal died. But its skin and flesh and tusks and skeleton did not rot. The ice kept them from rotting. Fossil hunters have dug several mammoths from the ice.

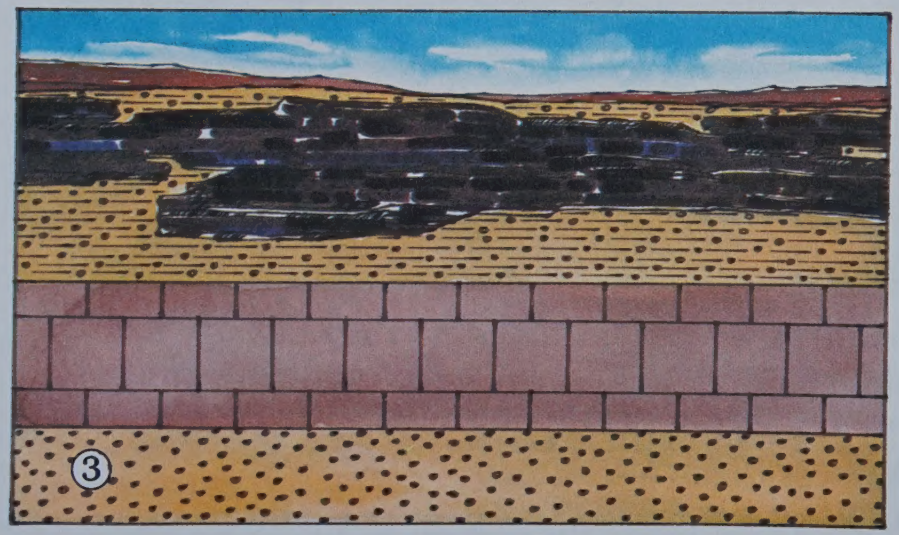
Sometimes, the plants and animals of long ago became a different kind of fossil when they died. They became coal, crude oil, and natural gas. People call these fossils "fossil fuels" because we can burn them to get energy. So, the people who look for coal, crude oil, and natural gas are fossil hunters, too.

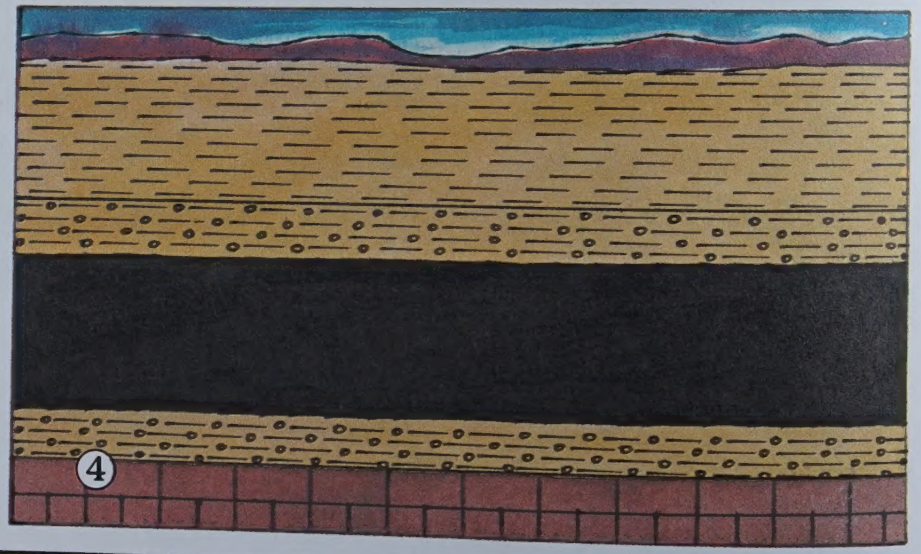
Answer these questions.

1. What are fossils?
2. Where are fossils found?
3. Why do you think coal, crude oil, and natural gas are called fossil fuels?

3

Buried Sunshine: The Story of Coal





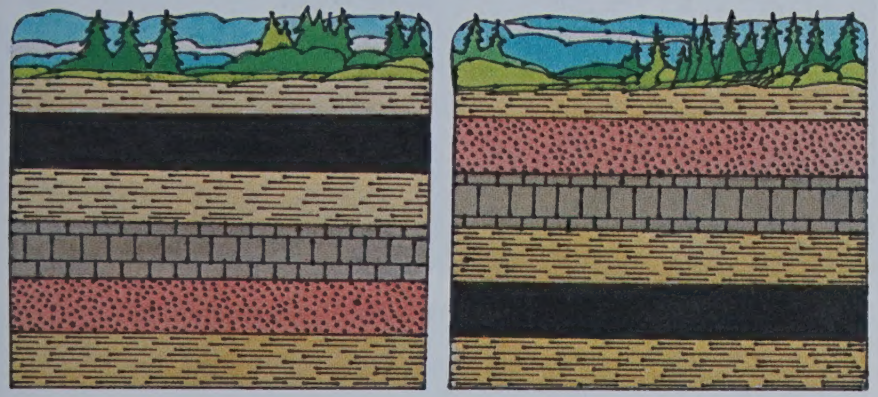
Answer these questions.

1. What is coal made of?

2. How did coal get into the ground in the first place?

Mining for Coal

Strip Mining



1. Sometimes coal is found close to the surface of the earth. Sometimes it is found deep underground. Layers of coal are called *seams*.

2. If the coal is close to the surface, big machines scrape away the topsoil and rock. This uncovers the coal seam.

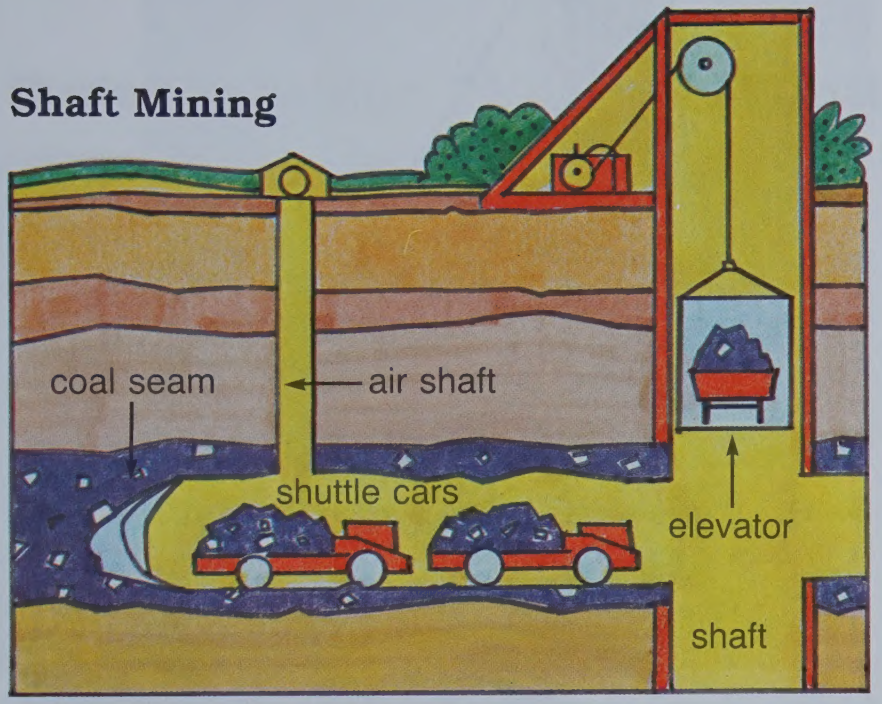
3. Holes are drilled into the coal seam. Then, it is blasted into pieces.

4. Smaller machines scoop up the coal and rock. They load it into trucks.

Answer these questions.

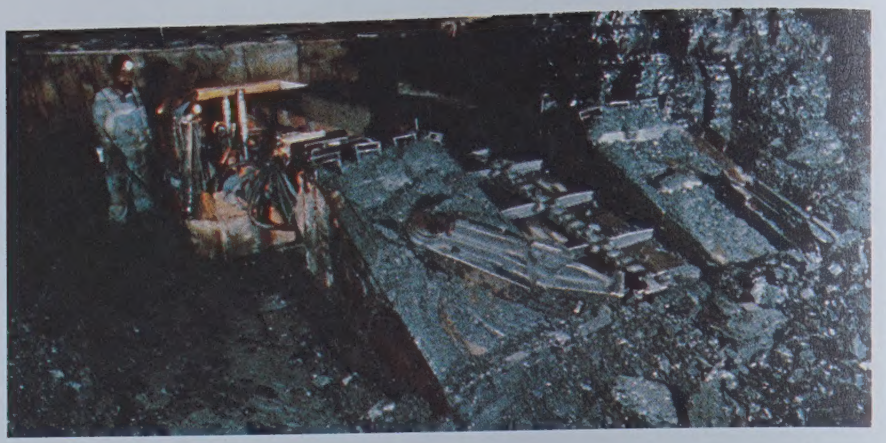
1. What is the machine doing in Picture 2?
2. What is uncovered?
3. What happens next?
4. What is the machine doing in Picture 4?

Shaft Mining



1. Deep holes, called *shafts*, are dug to reach coal seams that are deep underground.

2. Down in a shaft mine, machines cut and blast the coal loose from the seams.



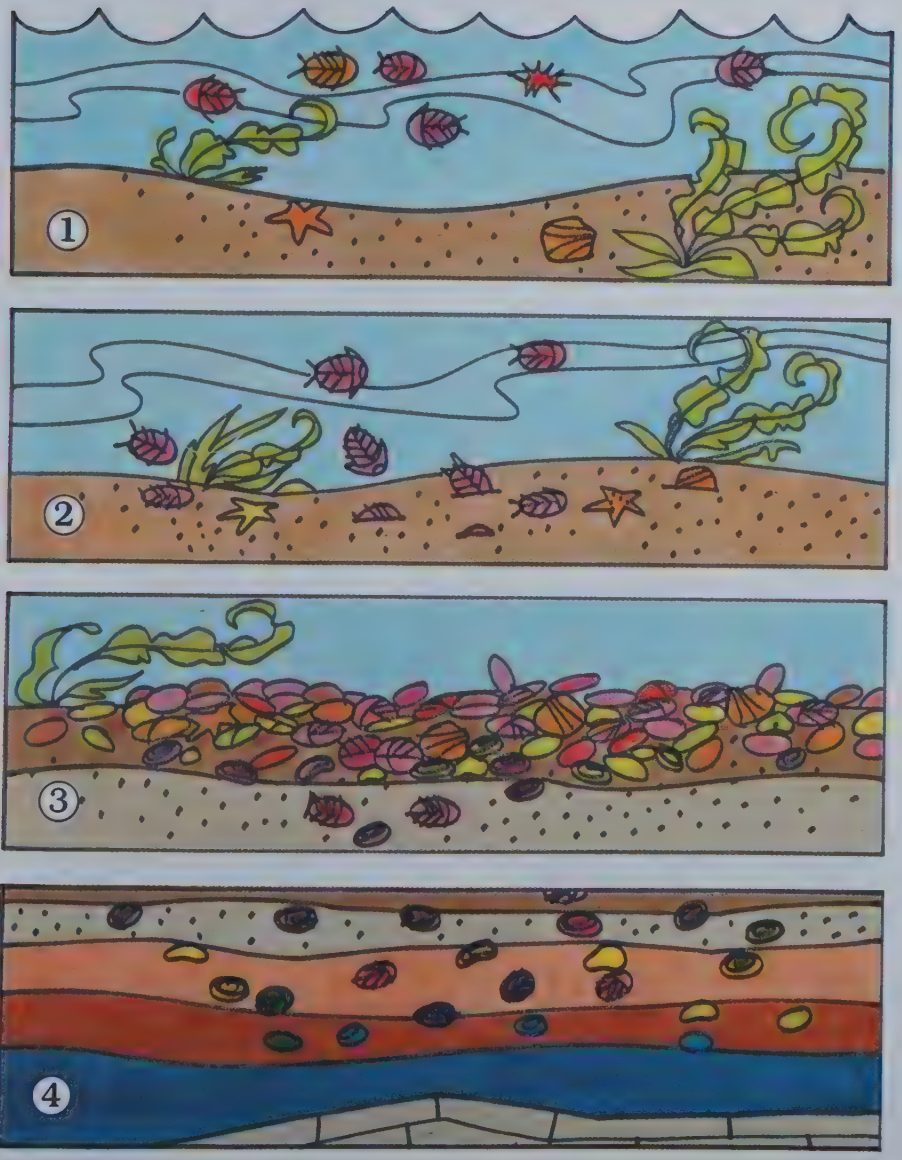
3. Then machines scoop up the lumps of loosened coal.

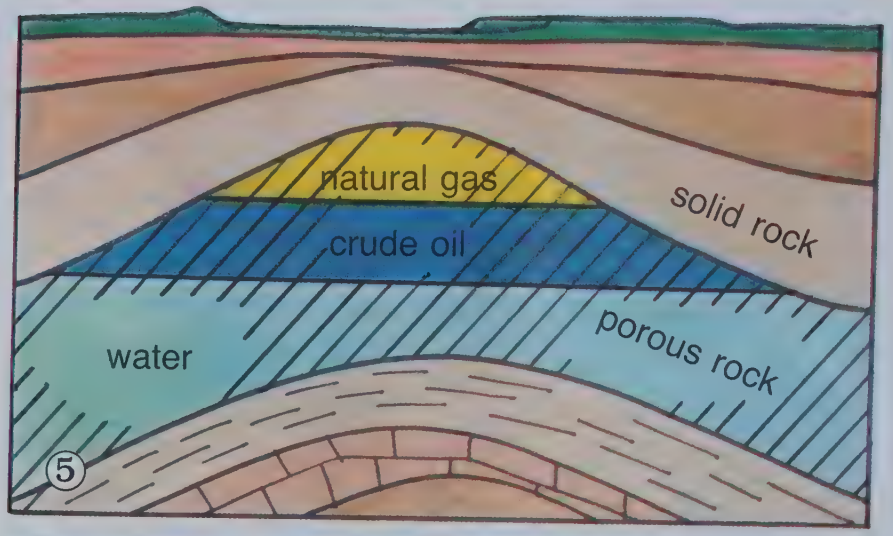
4. Shuttle cars carry the coal to the shaft. The coal is lifted to the surface by elevator.

Answer these questions.

1. What are *shafts*? Why are they dug?
2. What is the machine doing in Picture 2?
3. What are the shuttle cars doing?
4. How does the coal get to the surface?

Buried Sunshine: The Story of Crude Oil and Natural Gas





Answer these questions.

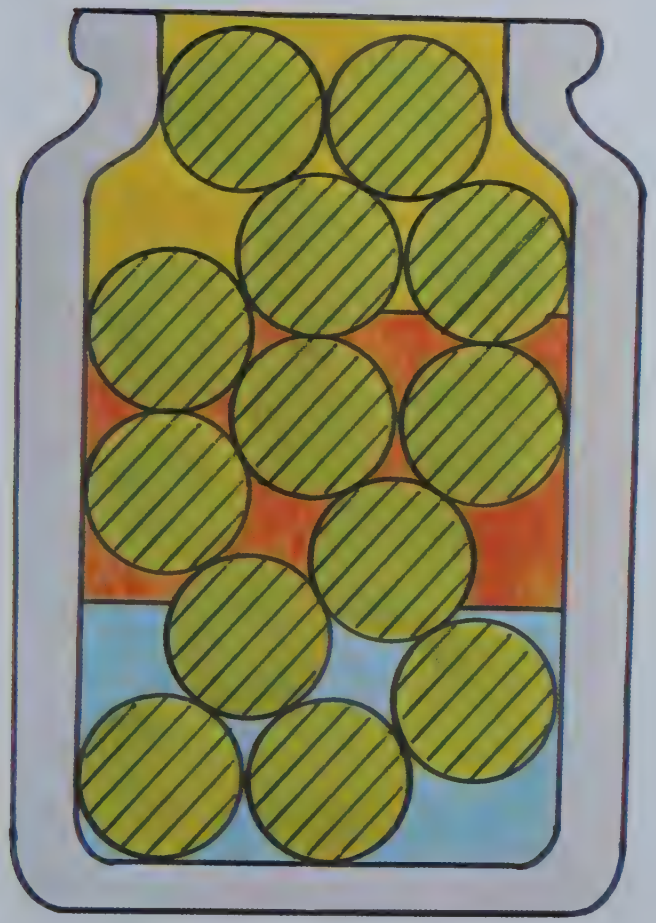
1. What are natural gas and crude oil made of?
2. How did crude oil and natural gas get into the ground in the first place?

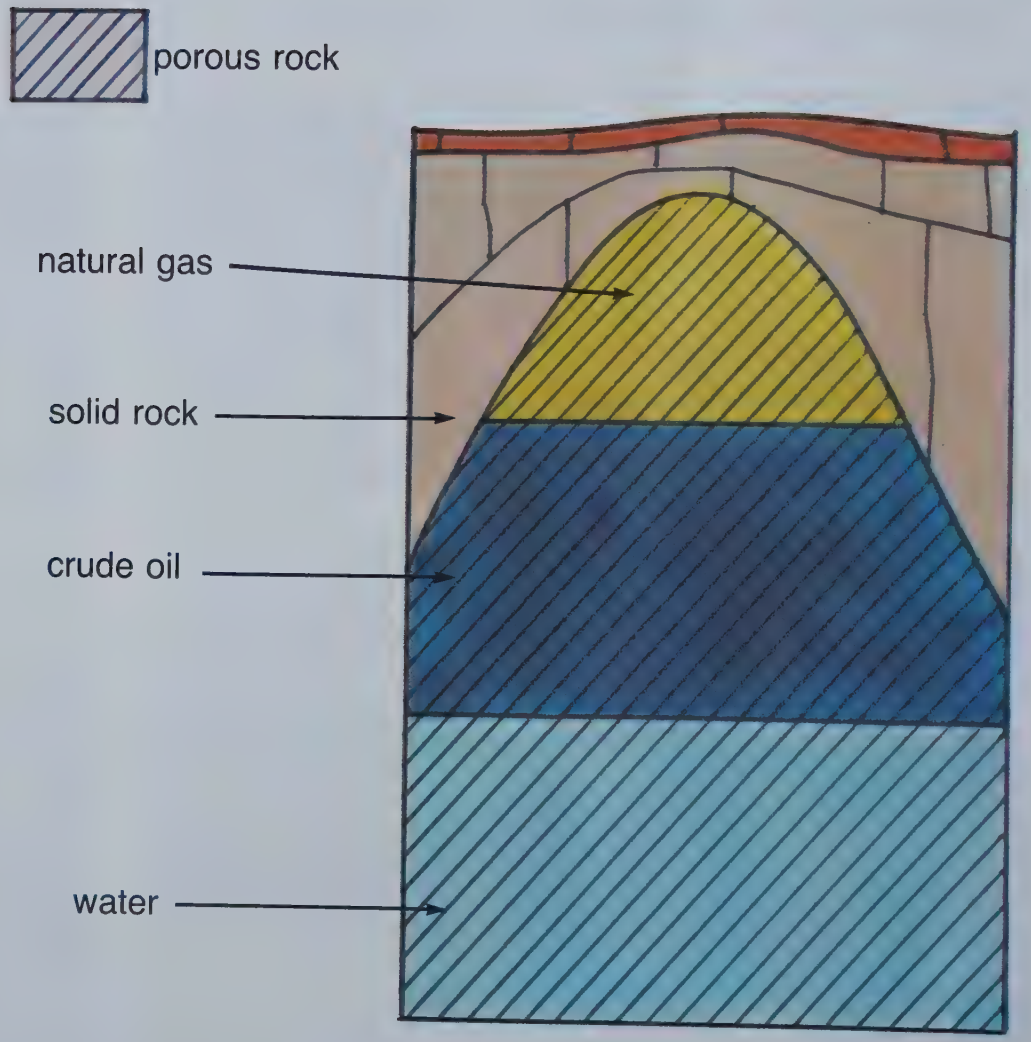
Can oil go into rock?

Answer these questions.

1. Did the oil go into the brick (porous rock)?
2. Did the oil go into the tile (nonporous, solid rock)?
3. Crude oil often moves long distances from the place where it is formed. How?
4. How does crude oil sometimes become trapped?

Two Oil Traps

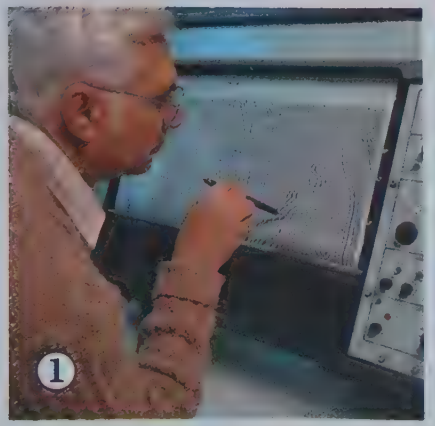




Answer these questions.

1. What does the water stand for?
2. What do the marbles stand for?
3. What does the oil stand for?
4. What does the air stand for?
5. What does the glass jar stand for?

Drilling for Oil and Natural Gas



1. First scientists do tests to see if there might be oil under the ground.

2. To get the oil, oil workers bring out a machine called a *drilling rig*. The drilling rig has a tall tower called a *derrick*.

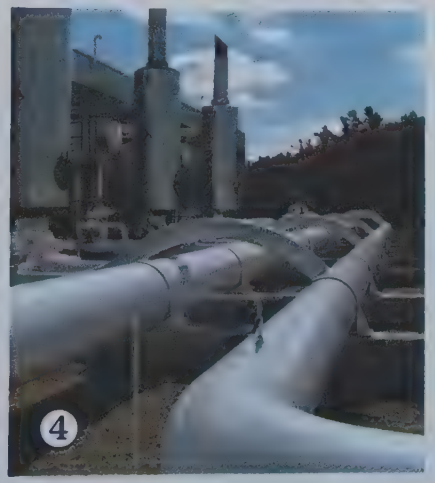
3. A long pipe fits down inside the derrick. At the end of the pipe is a *drill bit*. Powerful engines drive the drill bit down through earth and rock.

4. If the drill bit strikes oil, some of the oil may rush up through the pipe by itself. Pumps like these raise the rest of the oil to the surface.

Answer these questions.

1. How do people know that there might be oil under the ground at a certain spot?
2. What is the name of the machine that the oil workers bring to the spot?
3. What is the name of the tall tower on a drilling rig?
4. What do the workers put on the end of the long pipe that is inside a derrick?
5. What does a drill bit do?
6. If there is oil in a well, how does it get up to the surface?

Getting Fossil Fuels Ready for Use



1. This train is taking coal to a power plant where it will be burned to make electricity.

2. Crude oil is often carried across the ocean to refineries in big ships called *tankers*. They are called tankers because they carry the oil in big tanks.

3. Once the oil has been refined, it is taken across the country in large tank trucks like this one.

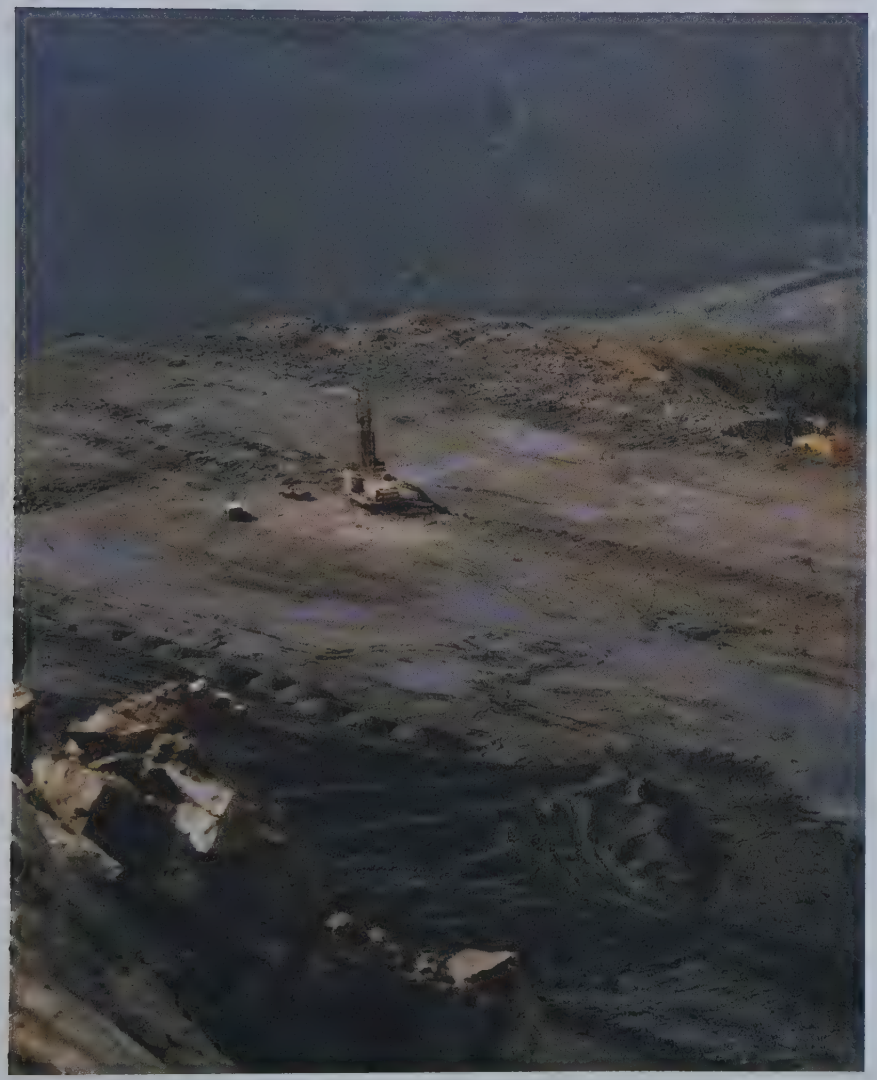
4. Natural gas is taken from place to place by pipeline.

Answer these questions.

1. What must be done to crude oil and natural gas before we can use them?
2. How is natural gas taken from place to place?
3. How is coal taken from place to place?
4. Where is it usually taken?
5. How is crude oil carried across the ocean?

8

Fossil Fuels and the Environment



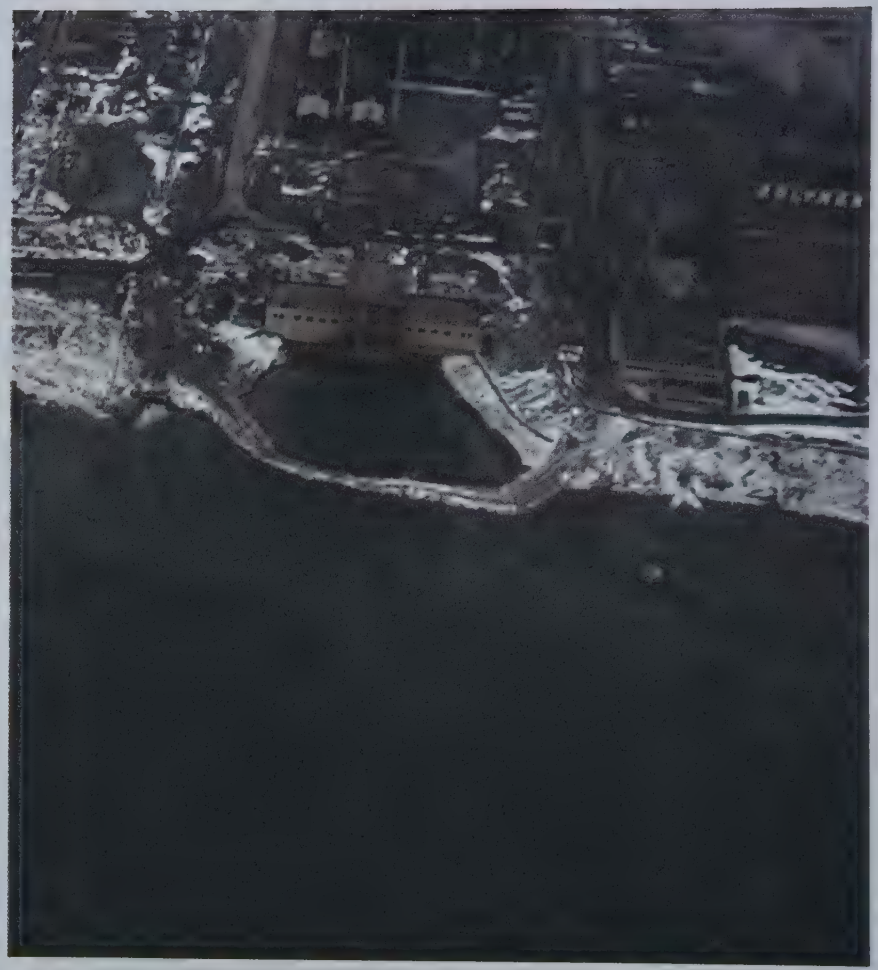
1. This is what a strip mine looks like. Once the coal has been taken out, big machines smooth out the earth and put back the topsoil.

2. Once the land has been prepared, seeds are planted.

3. Trees can be planted, too.

4. This is how strip-mined land *can* look. Sometimes it is better for farms or parks than it was before.

This is what can happen to a natural environment when oil is spilled on it.



This is what can happen to an environment made by people when oil is spilled on it.

Answer these questions.

1. How do people try to fix up the environment again after the mining is finished?

2. What can cause more damage to the environment—drilling for crude oil and natural gas, or moving them from place to place? Why?

10

Fossil Fuels are Nonrenewable

Answer these questions.

1. How much of the blue candle is left? Why?
2. How much of the yellow candle is left? Why?
3. What kinds of energy do we get from candles?
4. How much of the red candle is left? Why?

How Can We use Fossil Fuels Wisely?

How can we
use the toaster wisely?

How can we
use the electric mixer wisely?

How can we
use the stove wisely?

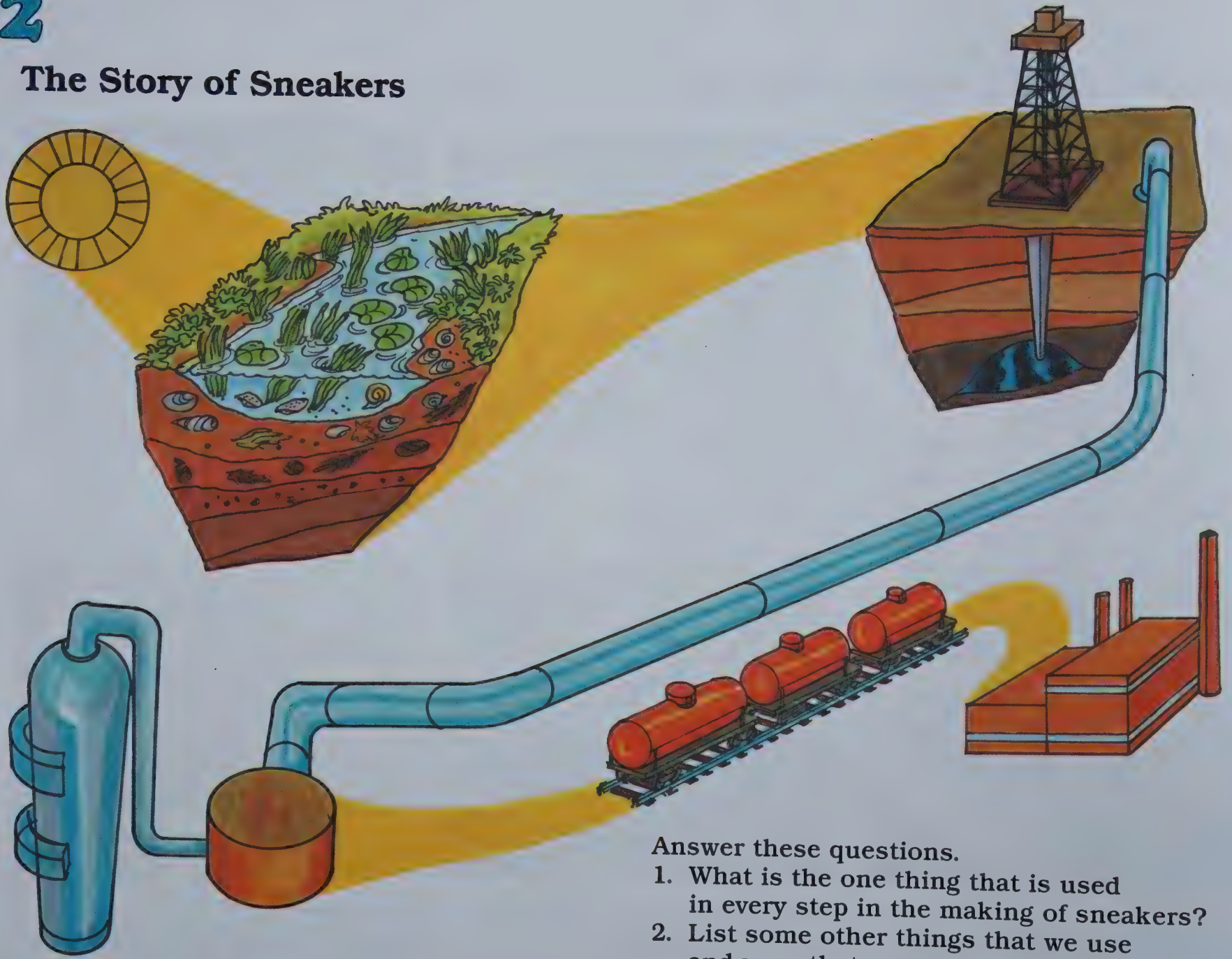
How can we
use the air conditioner wisely?

How can we
use the TV wisely?

How can we
use the electric toothbrush wisely?

12

The Story of Sneakers

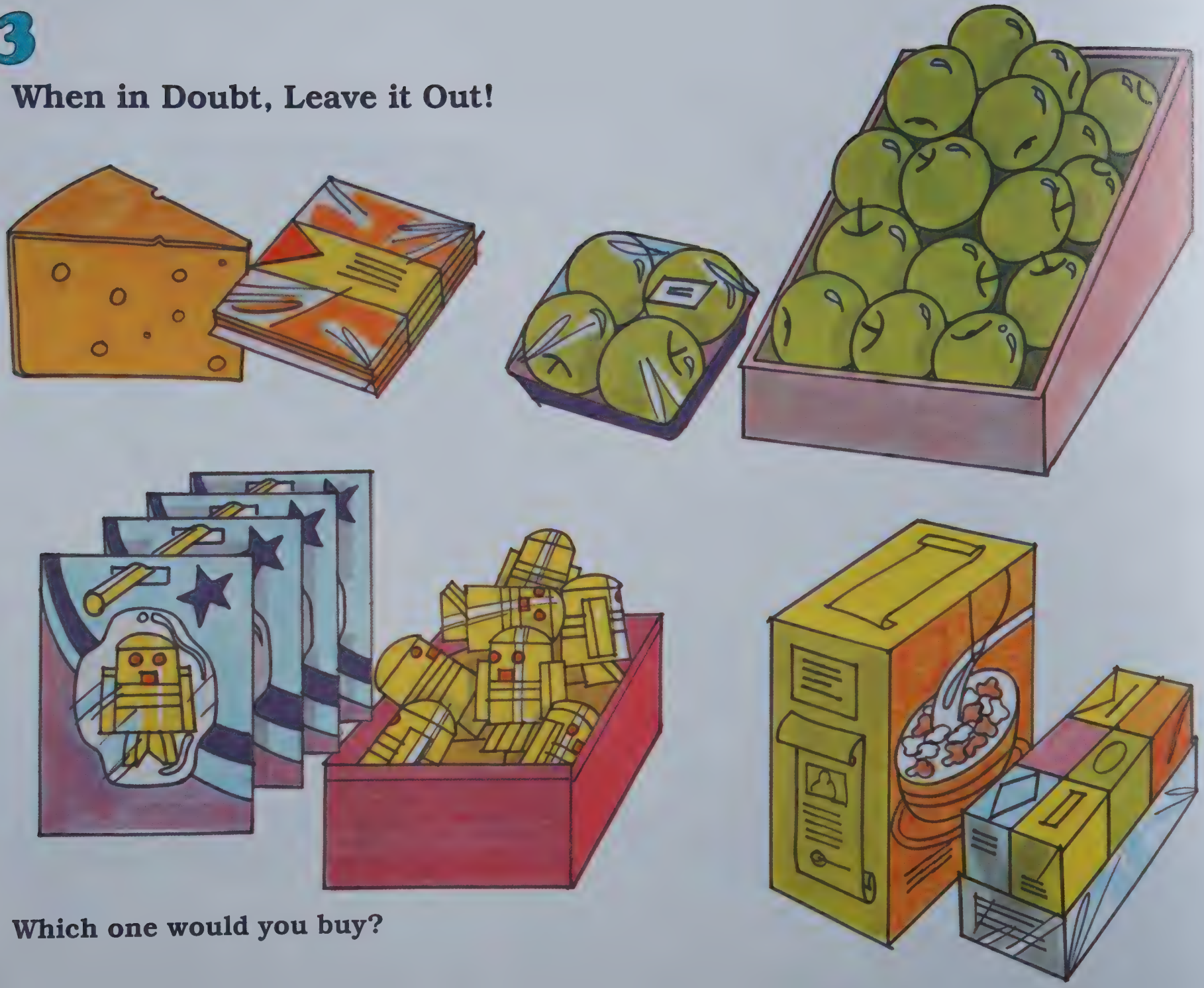


Answer these questions.

1. What is the one thing that is used in every step in the making of sneakers?
2. List some other things that we use and wear that are made in the same way.

13

When in Doubt, Leave it Out!



Which one would you buy?

Everything we throw away ends up here.

Answer these questions.

1. Which of the products on page 20 would you buy? Why?
2. What kinds of things should we try not to use?
3. Why should we try to reduce our use of things made from fossil fuels?
4. Why should we try to reuse things made from fossil fuels?

14

Use Other Kinds of Energy If You Can

①

②

③

Now that we know that the supply of energy from fossil fuels is limited, what can we do about it?

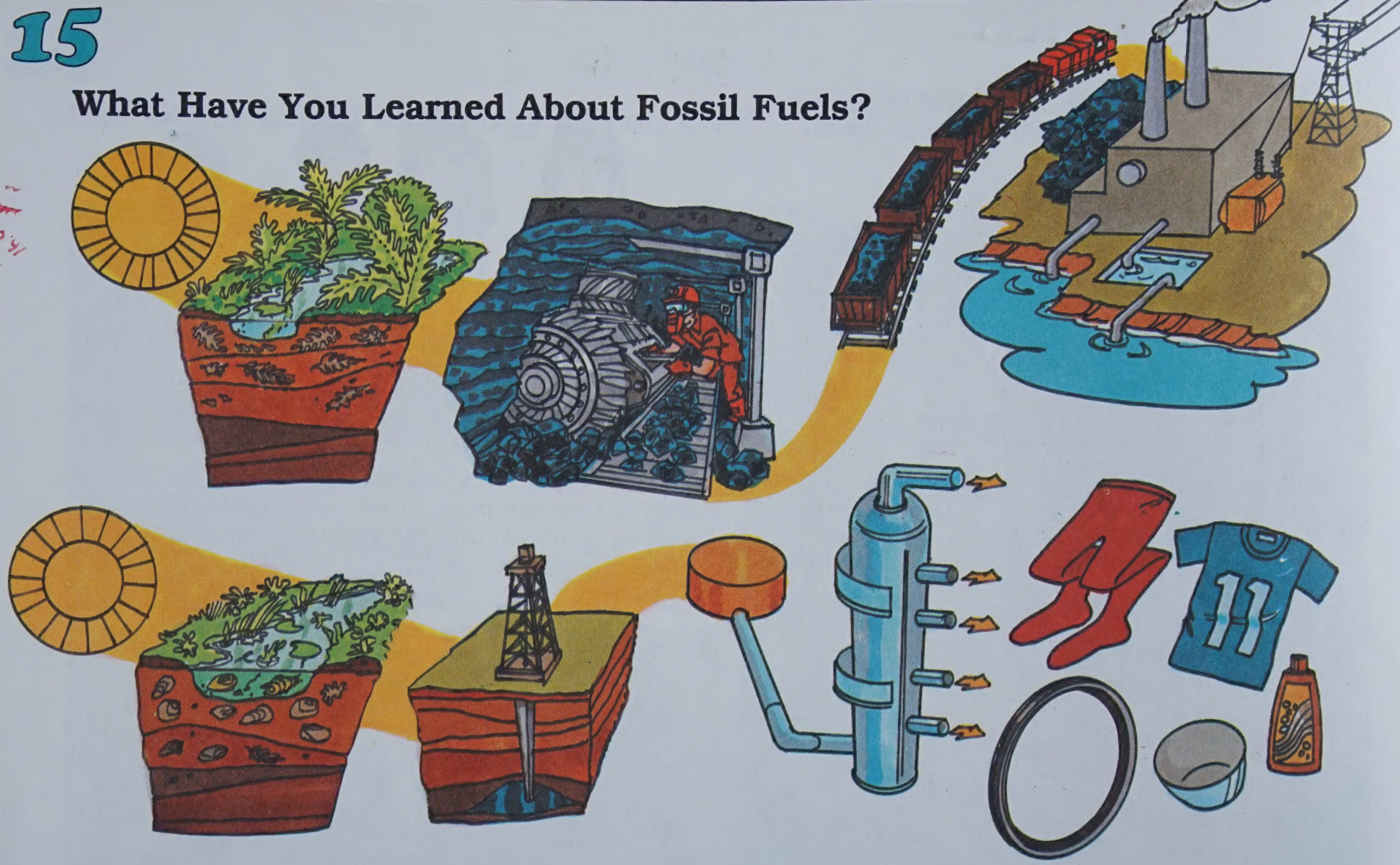
We don't really need some of the things that get their energy from fossil fuels. If we don't need them, we should stop using them.

We should try not to waste or throw away things that are made from fossil fuels. This will help to protect our environment, too.

We should use other kinds of energy whenever we can, especially food energy.

15

What Have You Learned About Fossil Fuels?



Answer these questions.

1. What are fossil fuels made from?
2. Why are fossil fuels called "buried sunshine"?
3. How do we get fossil fuels?
4. Once fossil fuels are out of the ground, what happens to them?
5. Why must we use fossil-fuel energy and products wisely?

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